AMENDMENTS TO THE CLAIMS

Please add or amend the claims to read as follows, and cancel without prejudice or disclaimer to resubmission in a divisional or continuation application claims indicated as cancelled:

1-51. (Cancelled)

52. (Currently Amended) An apparatus for transporting a high speed data stream over a channel consisting of a plurality of relatively low bandwidth twisted copper pair lines, comprising

encoder for applying an error correction encoding scheme to said high speed data stream;

a plurality of modem elements coupled to said plurality of twisted copper pair lines, each modem element associated with one of said copper pair lines and configured to operate at a data rate, delay, signal to noise ratio, and bit error rate independent of other modem elements;

a dispatcher operative to divide said encoded high speed data stream into a plurality of low rate data streams to be transmitted by said plurality of modem elements, said dispatcher adapted to forward a low rate data stream to each modem element in accordance with the data rate of each modem;

a collector operative to combine a plurality of data streams received by said plurality of modem elements into a received high speed data stream;

a decoder adapted to receive said received high speed data stream output from said collector and to apply an error correction decoding scheme so as to generate an original high speed data stream;

~~The apparatus according to claim 1, further comprising~~ means for selecting the parameters for codewords generated by said encoder so as to provide desired resiliency to line failures, minimum bit error rate (BER) and maximum bandwidth, said parameters consisting of K and R, wherein K-R represents the number of bytes in a payload portion of said codeword and R represents the number of bytes in a redundancy portion of said codeword, wherein said codewords are distributed to said plurality of modem elements for transmission over said plurality of low bandwidth twisted copper pair lines, each modem element having a data rate, delay, signal to noise ratio, and BER independent of other modem elements, said means for selecting comprising:

means for computing the maximum number of bytes from a codeword to be sent over each modem element in accordance with its corresponding data rate, for all valid combination of codeword size K and redundancy length R;

means for summing the number of bytes from a single codeword to be transmitted, for all combinations of line failures;

means for marking this combination only if said sum is less than R/2;

means for computing ~~the~~ an overhead for all marked combinations; and

means for selecting from among all combinations of K and R wherein an associated overhead was computed, the combination yielding a minimum overhead.

53. (Cancelled)

54-56. (Withdrawn)

57-105. (Cancelled)

106. (Currently Amended) A method of selecting the parameters for codewords generated by an encoder so as to provide desired resiliency to line failures, minimum bit error rate (BER) and maximum bandwidth, said parameters consisting of K and R, wherein K-R represents the number of bytes in a payload portion of said codeword and R represents the number of bytes in a redundancy portion of said codeword, wherein said codewords are distributed to a plurality of modem elements for transmission over a plurality of low bandwidth twisted copper pair lines, each modem element having a data rate, delay, signal to noise ratio, and BER independent of other modem elements, said method comprising the steps of:

for all valid combination of codeword size K and redundancy length R, computing the maximum number of bytes from a codeword to be sent over each modem element in accordance with its corresponding data rate;

for all combinations of line failures, summing the number of bytes from a single codeword to be transmitted;

marking this combination only if said sum is less than R/2;

for all marked combinations, computing ~~the~~ an overhead; and

selecting from among all combinations of K and R wherein an associated overhead was computed, the combination yielding a minimum overhead.

107. (Cancelled)

108-110. (Withdrawn)

111-130. (Cancelled)

131-134. (Withdrawn)

135-138. (Cancelled)

139-142. (Withdrawn)

143-147. (Cancelled)

148. (New) The apparatus according to claim 52, wherein said dispatcher further comprises:

a two dimensional buffer comprising a plurality of cells arranged as a plurality of rows and columns, each row associated with a different modem element and each column representing a single symbol, transmitted at the highest transmission rate;

an input sequencer adapted to distribute said high speed data stream to cells in said buffer, the amount of data distributed to each row is determined in accordance with the particular data rate of the modem corresponding thereto; and

an output sequencer adapted to distribute the contents of the cells in said buffer to said plurality of modem elements.

149. (New) The apparatus according to claim 148, wherein said input sequencer comprises filling means for:

filling the cells of said buffer with bytes beginning with the first cell of the first row;

finding the next available cell in said buffer;

placing a byte in the next available cell if the maximum allowable number of bytes from one codeword have not yet been placed in the particular row; and

repeating said steps of finding and placing for all codewords in one cycle of said input sequencer.

150. (New) The apparatus according to claim 149, wherein said filling means comprises filling any unfilled cells with null symbols.

151. (New) An apparatus for transporting a high speed data stream over a channel consisting of a plurality of relatively low bandwidth twisted copper pair lines, comprising

encoder for applying an error correction encoding scheme to said high speed data stream;

a plurality of modem elements coupled to said plurality of twisted copper pair lines, each modem element associated with one of said copper pair lines and configured to operate at a data rate, delay, signal to noise ratio, and bit error rate independent of other modem elements;

a dispatcher operative to divide said encoded high speed data stream into a plurality of low rate data streams to be transmitted by said plurality of modem elements, said dispatcher adapted to forward a low rate data stream to each modem element in accordance with the data rate of each modem, wherein said dispatcher further comprises:

a two dimensional buffer comprising a plurality of cells arranged as a plurality of rows and columns, each row associated with a different modem element and each column representing a single symbol, transmitted at the highest transmission rate;

an input sequencer adapted to distribute said high speed data stream to cells in said buffer, the amount of data distributed to each row is determined in accordance with the particular data rate of the modem corresponding thereto; and

an output sequencer adapted to distribute the contents of the cells in said buffer to said plurality of modem elements;

a collector operative to combine a plurality of data streams received by said plurality of modem elements into a received high speed data stream; and

a decoder adapted to receive said received high speed data stream output from said collector and to apply an error correction decoding scheme so as to generate an original high speed data stream;

152. (New) The apparatus according to claim 151, wherein said input sequencer comprises filling means for:

filling the cells of said buffer with bytes beginning with the first cell of the first row;

finding the next available cell in said buffer;

placing a byte in the next available cell if the maximum allowable number of bytes from one codeword have not yet been placed in the particular row; and

repeating said steps of finding and placing for all codewords in one cycle of said input sequencer.

153. (New) The apparatus according to claim 152, wherein said filling means comprises filling any unfilled cells with null symbols.

154. (New) The apparatus according to claim 151, wherein said dispatcher comprises means for interleaving said encoded high speed data stream before distribution to said plurality of modem elements.

155. (New) The apparatus according to claim 151, wherein said collector comprises means for de-interleaving said received high speed data stream.

156. (New) The apparatus according to claim 151, further comprising an interleaver operative to divide codewords generated by said encoder into a plurality of shorter data segments, said shorter data segments forwarded to said dispatcher such that during any period of time only a portion of a codeword is transmitted over said plurality of twisted copper pair lines so as to provide protection from burst noise.

157. (New) The apparatus according to claim 151, further comprising a scrambler adapted to scramble said high speed data stream before said error correction coding scheme is applied by said encoder.

158. (New) The apparatus according to claim 151, further comprising a de-scrambler adapted to de-scramble said received speed data stream before error correction decoding by said decoder.

159. (New) The apparatus according to claim 151, further comprising means for excluding a particular twisted pair line from the plurality of twisted pair lines used for transmission of said high speed data stream in the event the quality of said particular twisted pair line drops below a threshold.

160. (New) The apparatus according to claim 151, further comprising crosstalk cancellation means comprising:

means for measuring a plurality of cable parameters including near end crosstalk between twisted pairs; and

means for canceling near end crosstalk from said received data stream in accordance with said cable parameter measurements.

161. (New) The apparatus according to claim 151, further comprising Near End Crosstalk (NEXT) cancellation means, comprising:

means for generating an estimate of a NEXT transfer function of the crosstalk caused by radiators nearby to a modem element;

means for generating an estimate of a NEXT disturbance signal in accordance with said estimated NEXT transfer function; and

means for subtracting said estimate of a NEXT disturbance signal from the signal received by a modem element.

162. (New) The apparatus according to claim 151, wherein said error correction encoding scheme comprises Reed Solomon block encoding.

163. (New) The apparatus according to claim 151, wherein said error correction decoding scheme comprises Reed Solomon block decoding.

164. (New) The apparatus according to claim 151, wherein said encoder is operative to generate a plurality of codewords of length K, each codeword consisting of a payload portion containing K-R bytes and a redundancy portion consisting of R bytes.

165. (New) The apparatus according to claim 151, wherein said encoder is operative to generate a plurality of codewords of length K, each codeword consisting of a payload portion containing K-R bytes and a redundancy portion consisting of R bytes, wherein K and R are chosen such that no more than R/2 bytes are corrupted in the event one or more lines are cut thus providing resiliency to a specified number of cut lines.

166. (New) The apparatus according to claim 151, further comprising means for selecting parameters for codewords generated by said encoder so as to provide desired resiliency to line failures, minimum bit error rate (BER) and maximum bandwidth, said parameters consisting of K and R, wherein K represents the length of the codewords, K-R represents the number of bytes in a payload portion of said codeword and R represents the number of bytes in a redundancy portion of said codeword.